

CLAIMS

What is claimed is:

1. A method of servicing a request to a redundant storage array including a plurality of storage media containing data and related parity data, said method comprising:

receiving a data request for data stored by a selected storage medium among said plurality of storage media; and

in response to receiving said data request while an update to said selected storage medium is being performed, servicing said data request by reference to said data and said related parity data of other storage media among said plurality of storage media.

2. The method according to Claim 1, said step of servicing further including:

automatically reconstructing requested data utilizing said data and related parity data from said other storage media; and

outputting said reconstructed requested data.

3. The method according to Claim 2, said step of automatically reconstructing further including:

determining a type of said data request; and

automatically reconstructing requested data utilizing said data and said related

5 parity data only in response to determining that said data request is a data read
6 request.

1 4. The method according to Claim 3, said step of determining further
2 comprising:

3 in response to determining that said data request is a data write request,
4 logging said data write request;

5 storing new data for said data write request;

6 setting said particular storage medium to a rebuild status;

7 rebuilding said particular storage medium utilizing said data and related parity
8 data from said other storage media; and

9 setting said particular storage medium to online status.

10 5. The method according to Claim 1, wherein said particular storage medium is a
2 disk, and said redundant storage array is a redundant disk array and wherein:

3 receiving a data request for data stored by a particular storage medium
4 comprises receiving a data request for data stored by a particular disk of said
5 redundant disk array.

1 6. An adapter for use with a data processing system including a redundant
2 storage array including a plurality of storage media containing data and related parity
3 data, said adapter comprising:

4 an updating circuit for receiving a data request for data stored by a selected
5 storage medium among said plurality of storage media; and

6 a request servicing circuit, in response to receiving said data request while an
7 update to said selected storage medium is being performed, for servicing said data
8 request by reference to said data and said related parity data of other storage media
9 among said plurality of storage media.

10 7. The adapter according to Claim 6, wherein said updating circuit is an adapter
11 processor.

12 8. The adapter according to Claim 6, wherein said request servicing circuit is an
13 exclusive-OR (XOR) processor for automatically reconstructing requested data
14 utilizing data and related parity data from other storage media during said updating, in
15 response to a data request by said system processor, said XOR processor coupled to
16 an adapter processor.

17 9. The adapter according to Claim 6, further including:

18 a non-volatile random access memory (NVRAM) for logging data write
19 requests.

1 10. The adapter according to Claim 6, further comprising:

2 a storage location for temporarily storing write data for said selected storage
3 media during said updating.

1 11. The adapter according to Claim 10, wherein said storage location is an adapter
2 cache.

1 12. The adapter according to Claim 11, wherein said adapter cache further
 includes:

 a battery-backup circuit, for preserving data stored on said adapter cache.

1 13. The adapter according the Claim 8, wherein said data request is a data read
2 request.

1 14. A disk system comprising:

2 an adapter according to Claim 6; and

3 a redundant storage array.

1 15. The adapter according to Claim 6, wherein said redundant storage array is a
2 redundant array of inexpensive disks (RAID).

1 16. A data processing system, comprising:

2 a system processor;

3 a system memory coupled to said system processor;

4 a redundant storage array; and

5 an adapter including a redundant storage array including a plurality of storage
6 media containing data and related parity data, said adapter further including:

 an updating circuit for receiving a data request for data stored by a
 selected storage medium among said plurality of storage media; and

 a request servicing circuit, in response to receiving said data request
 while an update to said selected storage medium is being performed, for
 servicing said data request by reference to said data and said related parity data
 of other storage media among said plurality of storage media.

1 17. The data processing system according to Claim 16, wherein said redundant
2 storage array is a redundant array of inexpensive disks (RAID).

1 18. The data processing system according to Claim 16, wherein said redundant
2 storage array stores data in stripes, wherein each said stripe further includes data and
3 related parity data.

1 19. The data processing system according to Claim 16, wherein said updating
2 circuit is an adapter processor.

1 20. The data processing system according to Claim 18, wherein said request
2 servicing circuit is an exclusive-OR (XOR) processor for automatically reconstructing
3 requested data utilizing said data said related parity data from other storage media
4 during said updating, in response to a data request by said system processor, said
5 XOR processor coupled to said adapter processor.

1 21. The data processing system according to Claim 16, wherein said adapter
2 further comprising:

3 a non-volatile random access memory (NVRAM) for logging all data write
4 requests and data read-with-intent-to-write requests.

1 22. The data processing system according to Claim 16, further including:

2 a storage location for temporarily storing all write data for said selected
3 storage media during said updating.

1 23. The data processing system according to Claim 22, wherein said storage
2 location is a temporary space on other storage media of said redundant storage array.

1 24. The data processing system according to Claim 22, wherein said storage
2 location is an adapter cache.

1 25. The data processing system according to Claim 24, wherein said adapter
2 further includes a battery backup circuit.

1 26. A computer program product comprising:

2 a computer-readable medium;

3 updating code encoded within said computer-readable medium for receiving a
4 data request for data stored by a selected storage medium among a plurality of storage
5 media; and

6 request servicing code encoded within said computer-readable medium, in
7 response to receiving said data request while an update to said selected storage
8 medium is being performed, for servicing said data request by reference to data and
9 related parity data of other storage media among said plurality of storage media.
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